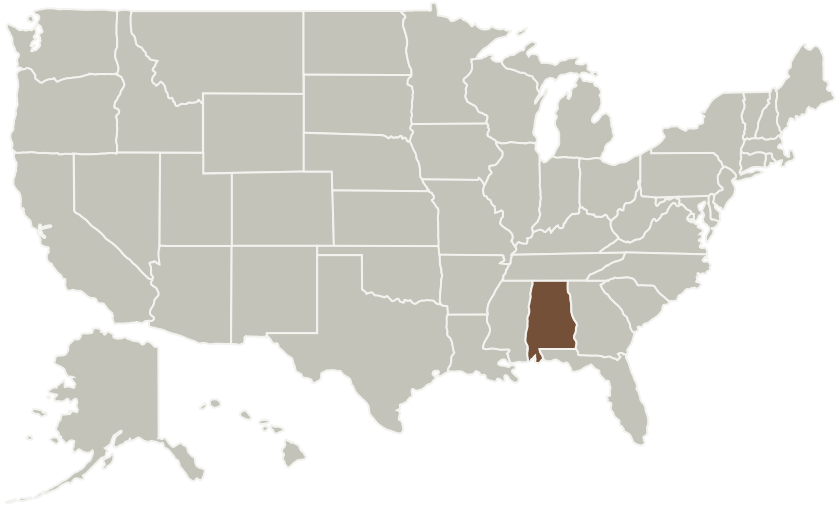
# Carbon Nano-Composite Ablative Rocket Nozzles, Phase I

Completed Technology Project (2009 - 2010)

## Project Introduction

The constantly evolving science of nanotechnology keeps coming around to old ideas re-tooled with new technologies. Though much work has been done examining the potential for nanotechnology to be used in ablative materials in a rocket nozzle, there have been relatively few testing opportunities of this application. Carbon nanofiber (CNF) composites have been identified as a lightweight and effective material that could be used in rocket motor applications. This technology when used in rocket nozzles could exhibit increased ablation resistance in the throat area and lower backside temperatures that would allow higher temperatures inside the nozzle. This could translate into a nozzle lighter in mass and higher in durability than conventional ablative nozzles. Benefits from this application could trickle across the board of high-temperature and dynamic pressure environments of different types of rocket motors.

## Primary U.S. Work Locations and Key Partners



| Organizations Performing Work | Role | Type | Location |
|---|---|---|---|
| Orion Propulsion, Inc. | Supporting Organization | Industry | Huntsville, Alabama |

| Primary U.S. Work Locations |
|---|
| Alabama |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## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

**Program Director:**

Jason L Kessler

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## Project Management *(cont.)*

**Program Manager:**

Carlos Torrez

## Technology Areas

**Primary:**

- TX14 Thermal Management Systems
  - TX14.3 Thermal Protection Components and Systems
    - TX14.3.1 Thermal Protection Materials